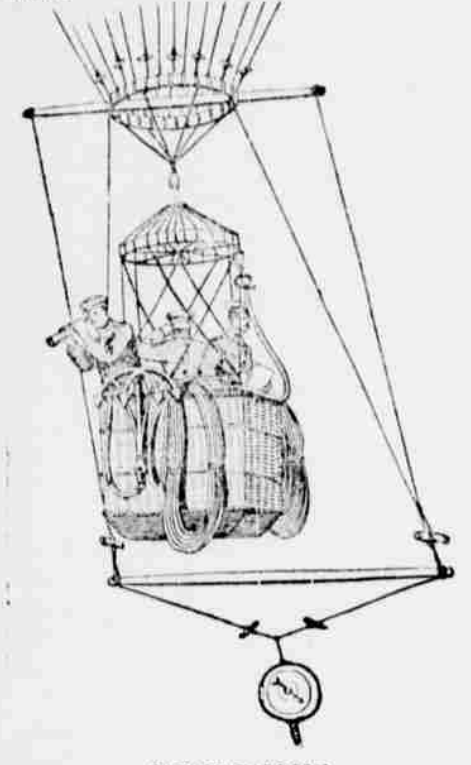


SCIENCE & PROGRESS

Stationary Military Balloons.

During the war in Tonquin the French made valuable use of balloons to observe the movements of the enemy. The apparatus was fastened to the ground, and the bag and car ascended several hundred feet into the air. Then, with field glass, the observer investigated the enemy. The balloon is held to the ground by a cable, which is paid out upon a winch. The technical military name for the whole machine is a "captivity balloon," meaning thereby not a balloon that has been captured, but one that is held captive by a cable that reaches from it to the earth.

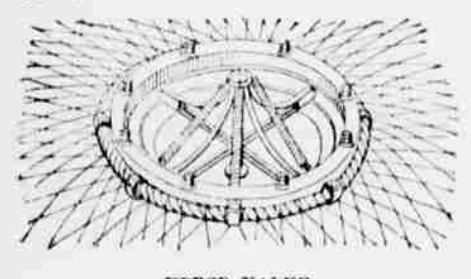


CAR OF BALLOON.

England and Germany followed France in order to observe plants among military equipments, and now Italy and Russia have followed suit. Indeed, the inventor is at present at work trying to make a steerable balloon for the czar's government. It does not appear quite when we are to have the machine attached to our army in the United States.

The builder of all the captive balloons is one man, a Frenchman, M. Stephen Yon. France is the native country of balloons. That in the picture is from a drawing of one recently constructed for Russia.

The apparatus consists of three main parts: the balloon, the gas generator for inflating it, and the cable and windlass. The bag is of Chinese silk, covered with balloon varnish. The netting is of Naples hemp. The car is very neatly suspended. The balloon can lean over at any angle without tipping the car out of the level. A dynamometer measures the ascensional power, and indicates at any moment how powerfully the balloon is dragging upon the cable. The most unique feature is perhaps the telephone, through which the observers in the car can talk down to those on the earth. An insulated wire is wound around the cable. The car is freely balanced in the strong frame that appears below the netting. This is what prevents its tipping.



UPPER VALVE.

Of admirable construction also are the upper and lower valves. The adaptations to make them fit tight are perfect. Metallic bars press upon a band of india rubber, by means of springs. The four lines of coiled spring are shown in the illustration. A brake rope and anchor are provided, in case of a free ascent.

The inflation is with hydrogen, generated by decomposing water with iron and sulphuric acid. The generator is mounted upon a four-wheeled carriage, which is drawn by two horses. Thus it can be taken from place to place. The water and acid are distributed automatically by the aid of a small steam engine. The ascension windlass is worked by steam. On the whole, what would civilization be without steam? The windlass, too, is mounted upon a wagon. From 8,500 to 17,000 cubic feet of hydrogen are produced in an hour.

A third carriage hauls the folded balloon and its belongings. A complete aeronautic plant weighs 16,500 pounds distributed between the carriages. Supplies of iron, coal and acid must be carried with the army baggage.

La Nature, a French scientific journal, publishes the complete description of the captive balloon, and felicitates itself that so perfect an invention is the work of a Frenchman. Then, with the usual despairing howl, La Nature adds:

"How much service such balloons would have been able to render France during the war of 1870, while the enemy was so skillfully hiding its movements!"

Frenchmen can never forget 1870.

The Megaphone.

The introduction of the megaphone on shipboard—a sort of telescope for the ear, or machine for magnifying sound—is said to be a boon in prospect for mariners. Its design is to enable a person to hear or carry on a conversation with people at a distance, and it is constructed of two huge cone-shaped tubes, eight feet long and three in diameter at the large end, which diminish to an apex in the form of rubber tubes small enough to place in the ear. Between these tubes are two smaller ones, constructed in the same manner, but not more than half the diameter. By placing the rubber tubes in the ear and speaking through the smaller cones the person can hear and be heard at a long distance, and it thus aids mariners in listening for the sound of breakers, or carrying on conversation with persons on shore or on other vessels at a distance.

Underground Telegraphs in Germany.

The question of underground wires, which is now being agitated in American cities, has so far been answered abroad in the affirmative, that in several countries, and notably in Germany, the underground system has been adopted for communication between distant cities. It was in 1875 that Dr. Stephan, the director general of German posts and telegraphs, conceived the idea of that great underground network of telegraphic cables which now connects the principal cities of the empire. The favorable results which had been obtained from the cables of galvanized iron wire, insulated with gutta percha, which were manufactured by the well-known engineering firm of Felten & Guilleaume, of Cologne, induced the government to experiment with this cable, and, finally in the following year, to adopt it in the construction of the underground lines

between Berlin and Halle. This was recognized as simply experimental. The distance between the two cities is 130 miles, though the connecting cable had a length of 175 miles. There were seven conductors in this cable, and consequently a total mileage of 1,225 miles. The work of construction began in March, and was completed during the following July. This line was eminently successful, and demonstrated to the satisfaction of the administration that the rapidity of transmission was adequate, and that the inductive action of the parallel currents would cause no embarrassment. In consequence, the system was extended over the entire empire, and as finished in 1880 had a total length of cable of 4,000 miles, and of conductors of not less than 28,000 miles. A portion of this network was constructed of cables composed of seven copper wires, 0.6 of a millimeter in diameter, and insulated with gutta percha and Chatterton compound. The size and number of the conductors varied in the different cables, but were usually greater in those of later construction. The joints in the cables occurred, as a rule, once in every kilometer (3,280 feet 10 inches) and were protected by means of cast iron boxes. After the laying of each section electrical tests were made upon the whole of the cable in place, in order to prove the joints. Ditches to receive the cable were made about one meter deep, except in those places where masonry or rock interfered, and then a depth of three-quarters of a meter was deemed sufficient. A meter is about a yard and 3 1/2 inches. In transporting the cables they were wound on large wooden bobbins, and were protected by a covering of straw and sheet iron. The work of laying a cable is shown in our illustration. Since the establishment of the system, electrical tests have been made once every month, and show that in some cases the insulation has improved, while the oldest cable, laid about nine years ago, is as good to-day as when first laid. The cables of the entire system have been manufactured by the same firm, and have cost, in position, about \$7,800,000. The example of Germany has since been followed by France, where underground cables are largely in use. They give, as a rule, the same rapidity of transmission as the aerial lines, and, from their protection from the atmosphere, are much more durable. Since the introduction of the telephone and electric



LAYING THE CABLE.

light Messrs. Felten & Guilleaume have made enormous quantities of cables for these purposes. Those surrounded with lead, and in insulated with impregnated hemp, are well known in the electrical world. The wire cables used on the San Francisco cable road are also of their manufacture.

THE FASHIONS

Winter Fashions in Flowers.

Roses will continue to be popular for corsage bouquets, hand bouquets, table decoration, and, in fact, everywhere in fashionable circles. But while the rose is solid in the affections of society people, they are looking about for a change in the style of rose that will wear. All the very beautiful roses, such as the Jacqueminot, have no odor. The demand now is for a showy rose with a sweet perfume. Two varieties are going to be favorites, all well-informed florists agree. One is the William Francis Bennett rose, raised in England by William Francis Bennett, a cultivator of hybrid roses near London. It is the color of the Jacqueminot rose, is richly fragrant, and is a tea rose. A florist of Philadelphia paid Mr. Bennett \$3,750 for the stock of the hybrid, so he alone can propagate it and sell slips and cuttings. It is an exceedingly prolific plant, and the buds will not come higher than the Jacqueminot did when introduced. Next to the Bennett in popular favor will be the American Beauty, also a crimson rose, but more like a hybrid perpetual than the Bennett rose. It is very fragrant.

How to Laugh.

Hand in hand with refined speech goes the refined laugh. The principal of a large boarding school once told me that close observation of her pupils had shown her that a latent vein of coarseness was sometimes revealed by a laugh, when the words and tones were carefully guarded; and I have heard the mother of a charming family say that she taught every one of her children to laugh. "Oh!" says some one, "do not ask us to talk and laugh by rule! All freshness and spontaneity would be lost, and nothing but affectation would remain."

Does a pianist lose his spontaneity when years of study have trained his fingers to fly over the keys? Has an artist lost his inspiration when his skilled brush paints on the canvas the pictures in his heart and brain?

We reach the truest liberty when our lives are so ordered by rules that we are unconscious of them, and do things in the right way because it has become easier than the wrong.

What Colors to Wear.

The French chemist Chevreul, from the Academy of Science, has made harmony of colors an especial study and directed his theories to ladies' toilets. He has given the following opinion regarding hats and bonnets. A black hat, with pink, white or red feathers is especially becoming to a fair complexion. Brunettes ought to choose black, yellow or orange feathers. A completely white hat demands a very bright complexion, all the same whether for fair or dark wearers. A fair lady should always wear a pink or blue feather in a white hat. For decided brunettes blue is decidedly unbecoming; they ought in preference to wear red or orange. Light blue bonnets are particularly becoming to very fair faces. If dark ladies venture to wear such bonnets they should at least have them trimmed with yellow. A green bonnet makes a delicate, soft complexion look even more beautiful; white or pale pink flowers are the proper trimming for this. A red hat or bonnet ought never to come close to the face, but must be relieved by a green or white inside trimming. White flowers with full foliage have a good effect on red. A dark red hat can only be worn by ladies possessing a very bright color. Violet hats and bonnets are not to be recommended; if worn they should have a yellow lining. Yellow hats should, in reverse to this, have another color against the face.

And one word of his learning, M. Chevreul has given—

will be of use to average American women. Half of them are neither light nor dark, but of that undecided state which is half way between. Moreover, at least half of them beyond the age of 25 have become sallow and pale in our trying climate. Some of the sweetest of their sex are afflicted in this way. Malaria plays the fiend with women's complexions. What, therefore, shall the great army of saffron-tinged complexions bring next to themselves that will be becoming? Well, after a barrel of ink has been shed on the subject, women must finally fall back upon black as the safest thing to wear. It should always be lightened with something white next the skin; creamy white is best. Then red roses or brilliant orange-colored flowers and ribbons may be worn effectively. Sallow women may also venture on dresses of navy blue, or of a deep, rich dark red without any tinge of purple to it. They can sometimes wear warm golden-tinged browns, but as a rule brown should be avoided. Gray, which colorless women look still more colorless, while brown gives them the tint of a tallow candle. Gray is a very severe color. Look at that portrait of Martha Washington, the mother of her country, in a gray kerchief! Some shades of strong yellow make becoming evening dresses for women with poor complexions.

Collar and Cuff Buttons.

(Jewellers' Circular.) So long as tailor-made suits remain fashionable the demand for collar buttons and cuff buttons will remain unabated, for linen collars and cuffs must perform a wear, a frill of lace or tulle being quite out of the question. There are no special changes to record in either class of buttons. Those for the collar are small in size. While gentlemen are patronizing largely the link buttons, ladies find the single button best suited to their purposes. The embossed or chased finish is taking the place of the nugget on many of these buttons. One is confined, however, to no special finish, but has the choice of an infinite variety, including bright, plain, Roman, opalized and other surfaces.

Babies' Cards.

When a new baby comes into the world in fashionable circles it is the style to announce its arrival "at home." As soon as it gets its name the same is printed upon a tiny card. The card is tied by a pink ribbon in the corner to its mamma's card, and the two together are sent to friends of the family. Especially is this done with a first new baby. When there come to be four or six of them the arrival of another one more or less is no such great matter any more.

FASHIONLETS.

Cashmere and velvet dress fronts have a rush to correspond.

Adjustable trains are added again to toilets intended to do double duty.

Necklaces have come in fashion again with the low-necked evening dresses.

Irish blarney, boncle and negro-head cloths are all one and the same thing.

Maize-colored satin trimmed with green is a favorite combination for full dress.

The "Mikado" has popularized Japanese ornamentation in small fancy articles again.

Several new veiling nets are shown, among others a fine silk fabric, so worn that it looks like a succession of tiny stars.

In wooden petticoats there is not much that is new, save in the colorings. They have broad gold stripes, and blue and jardiniere frise stripes, in green, blue, gold, etc.

The Latest Winter Costumes.

At her first reception of the season this winter, Miss Cleveland, the president's sister, wore a woaden dress. Her only ornament was a Maroon Niel rose at the throat. Her gown was tailor-made, dark brown, with astrakhan cloth trimmings of the same color. Among fashionables, that will probably add the last touch of popularity to the woaden gown for dress occasions.



RED FERN GOWN OF FUR AND WOOL.

Satins, velvets and brocades still appear at full dress evening receptions, dancing parties and grand dinners and suppers, like a man's dress suit, but for all other occasions the woaden gown is the fashionable garment.

Miss Cleveland's dress was somewhat like the one in the illustration. This, however, is trimmed with real fur. It is a brown dress trimmed with mink. The style is quite new, inasmuch as the fur also passes around the bottom of the skirt. Muff and hat to match.

Fig. 2 shows a Redfern combination suit of plain and striped wool goods.



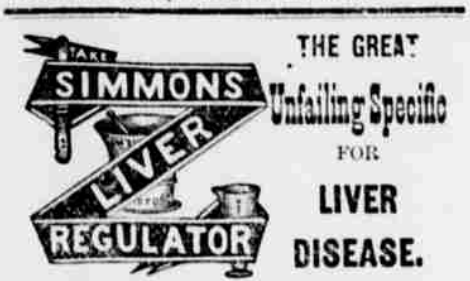
RED FERN COMBINATION SUIT.

It is better adapted for a tall, slender woman than a short one. The stripes pass around the skirt, and there are gathers in the waist. There is a full plastron of the striped goods over the breast, descending just below the waist where it is draped in four scanty folds in front. A slight vest flap of the same material shows just below the waist. The skirt is draped in four scanty folds.

A Remarkable Escape.

Mrs. Mary A. Dailey, of Tunkhannock, Pa., was afflicted for six years with Asthma and Bronchitis, during which time the best physicians could give no relief. Her life was despaired of, until in last October she procured a bottle of Dr. King's New Discovery, when immediate relief was felt, and by continuing its use for a short time she was completely cured, gaining in flesh 50 lbs. in a few months. Free trial bottles of this certain cure of all throat and lung diseases at Lutz & Briggs' drug store. Large bottles \$1.00.

We have been favored with samples of the Spencerian Double Elastic Steel Pens, from the American Agents, Messrs. Iverson, Blakeman, Taylor & Co., 753 and 755 Broadway, New York. The No. 23 Falcon we have been using for some weeks, and we must confess it is the most satisfactory pen for all purposes we have used for many years. It is an excellent pen in every way. They can be obtained of all stationers, and we can cordially recommend them.



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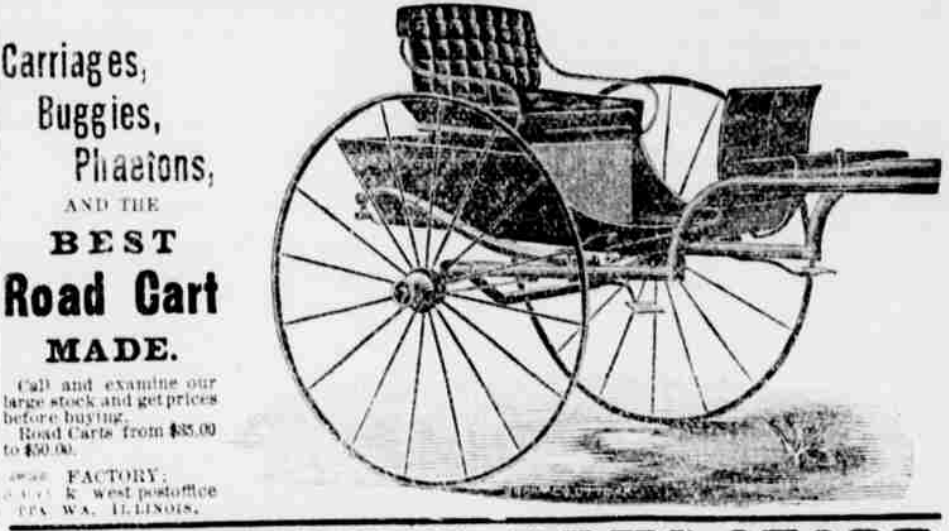
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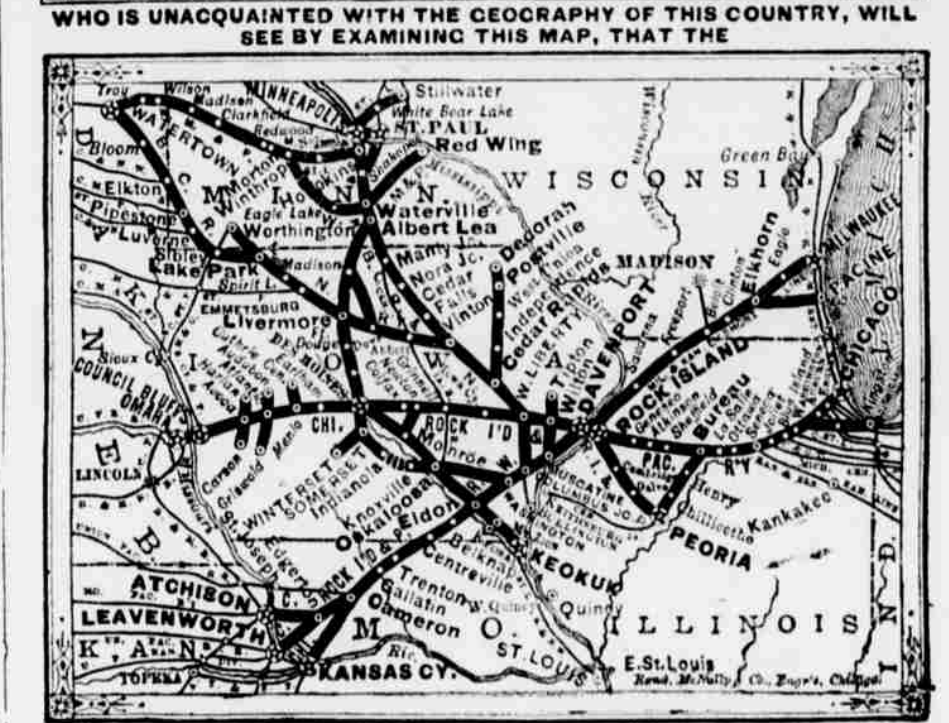
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